PredVIS

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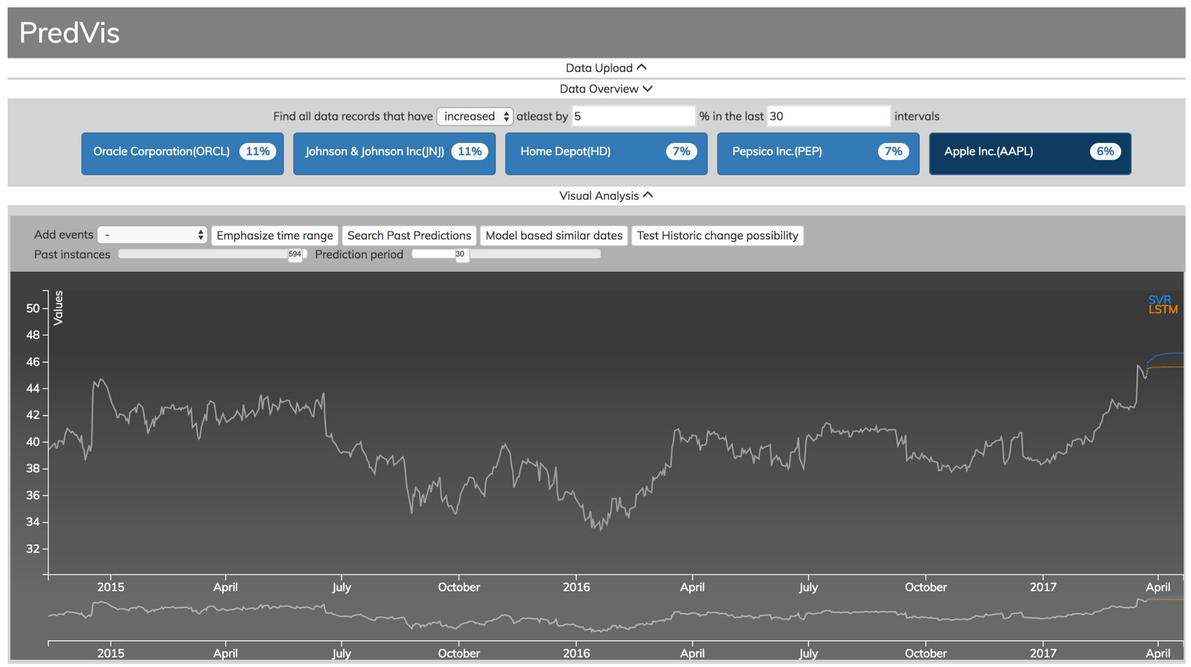
Interaction Techniques for Time Series Prediction

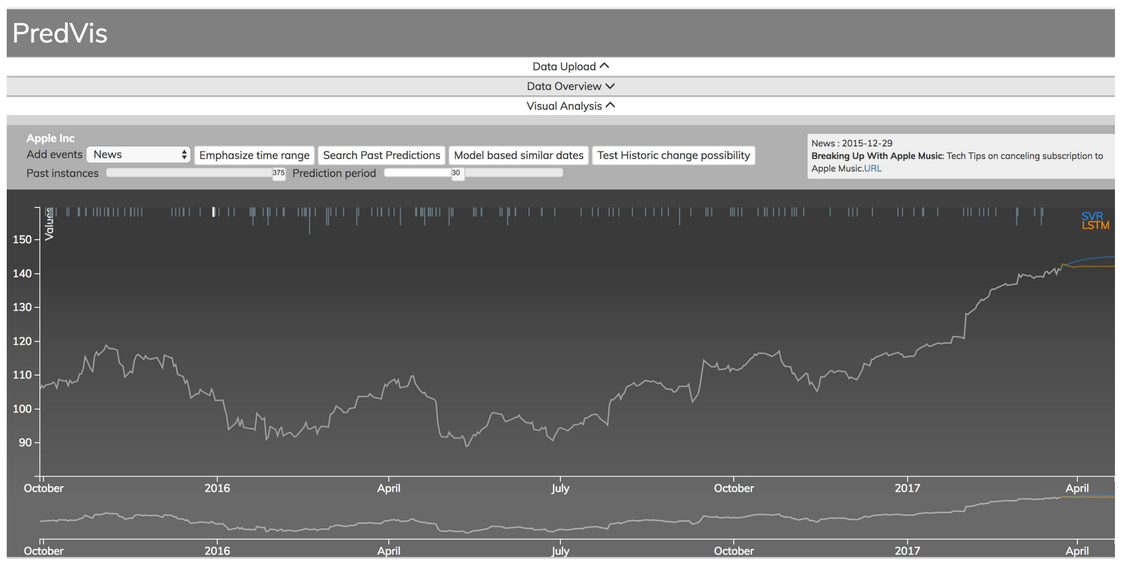
INTRODUCTION

With the increasing collection of time series data, a substantial amount of research and development efforts are being directed to gain deeper insights from such records. While innovative techniques have been examined, less work has been done in creating functional tools that use these methods for visual analysis.

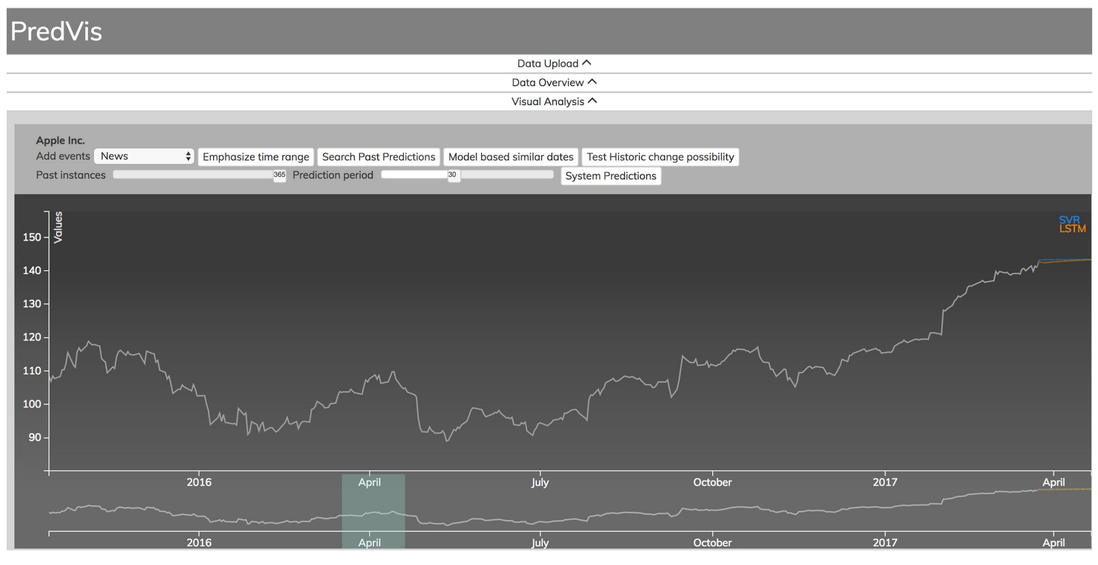
We have created **PredVis**, a mixed-initiative system that uses statistical and machine learning techniques to facilitate visual analysis of time series data for forecasting. The system provides tools to interact with model calculated results, visually query variances and integrate other dimensions of the data to improve user comprehension and decision-making.



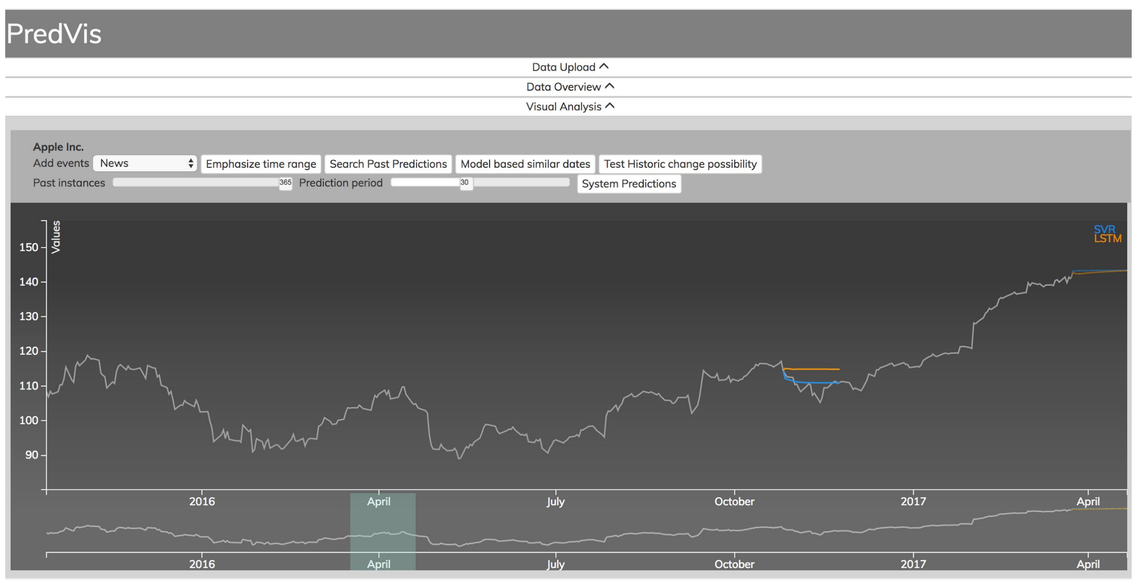
SYSTEM TECHNIQUES



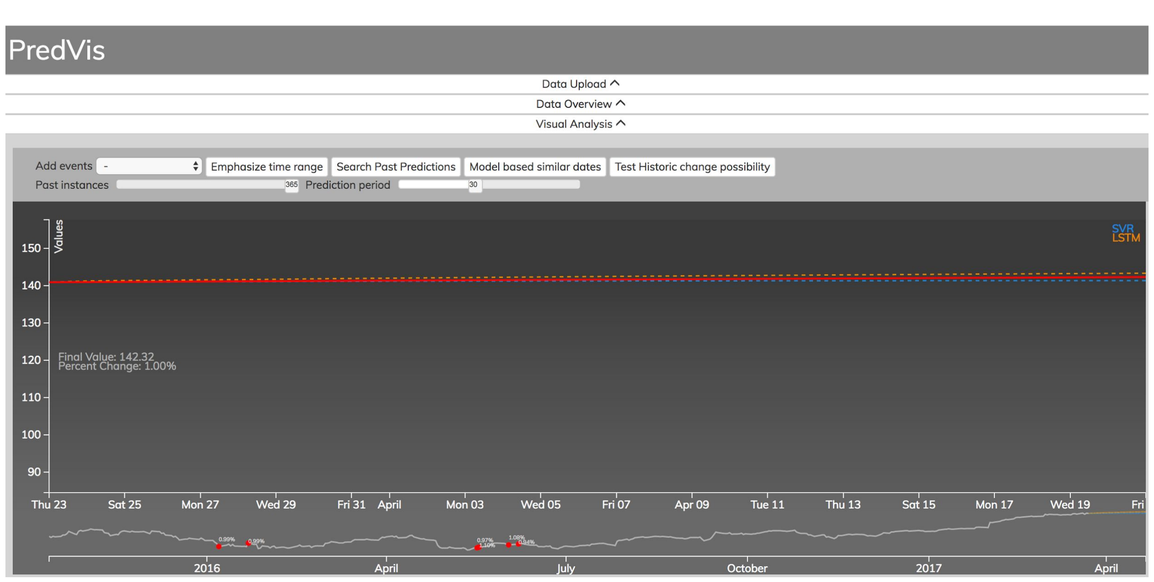
Prediction Modeling: To initialize the system, we use two independent models (LSTM and SVR) that calculate the predictions for a selected record. These models are trained on the user adjusted historical time period and for the time required



Weighted Regions: The system uses the concept of weighted prediction wherein users can select time intervals and give them weights to emphasize that the area is of higher relevance than the rest of the data. Recent or seasonal data might be more informative and can be assigned higher weight.



Model Evaluation: Evaluating the performance of a model is particularly important for the user. The user can see how the different algorithms would have performed at a given time instance by selecting that point in the graph and observing the results of the different models.



Assumption Evaluation: A user might postulate that the stock price will increase by 1% in the next 30 days. She could evaluate this by adjusting her expected percentage changes in the UI. The system then highlights all the points in time, if any, when similar changes have occurred. This helps the user gauge if her assumed change is possible and insight into its frequency.

KEY BENEFITS

- Facilitates human-computer collaboration
- Provides better comprehension
- Enables utilization of user's expertise
- Allows greater user engagement

Georgia Tech Visualization Lab